Alberta's Ambient Air Quality Objectives

Alberta's Ambient Air Quality Objectives[1] are established under Section 14 of the Environmental Protection and Enhancement Act (EPEA , R.S.A. 2000, c.E-12, as amended). EPEA provides for the development of environmental objectives for Alberta. The Ambient Air Quality Objectives are used for:

- Reporting on the state of the atmospheric environment in Alberta.
- Reporting to Albertans on the quality of the air through Alberta's Air Quality Index (AQI).
- Establishing approval conditions for regulated industrial facilities.
- Evaluating proposals to construct facilities that will have air emissions.
- Guiding special ambient air quality surveys.
- Assessing compliance near major industrial air emission sources.

Some of Alberta's Ambient Air Quality Objectives are based on odour perception. This is the case for ammonia, nitrogen dioxide and hydrogen sulphide. For these chemicals, people are likely to detect an odour at concentrations well below levels that may affect human health. Alberta's Ambient Air Quality Objectives for one-hour average concentration of pollutants monitored by the MAML are listed in Table B1.

Table B1: Alberta's Ambient Air Quality Objective measured by the MAML

Pollutant	One-hour AAAQO (ppm*)	Basis for Objective
Ammonia	2	odour perception
Carbon monoxide	13	oxygen carrying capacity of blood
Nitrogen dioxide	0.212	odour perception
Ozone	0.082	reduction of lung function and effects on vegetation
Hydrogen sulphide	0.01	odour perception
Sulphur dioxide	0.172	pulmonary function

* parts per million

[1] *Alberta Ambient Air Quality Objectives.* Alberta Environment. April 2005.

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The Mobile Air Monitoring Laboratory (MAML)

The MAML is a 27-foot (8.2 m) vehicle that has been specially designed and equipped to measure air quality. It houses a variety of instruments that continuously sample the air at specified time or distance intervals. The MAML is equipped with:

- a dual computer system custom-programmed to accept and record the measurement of air samples from each analyser,
- a GPS (Global Positioning System) that identifies the MAML's location as it moves around Alberta,
- an exhaust purifying system that minimizes emissions from the vehicle and
- two on-board generators that are also equipped with exhaust scrubbers

Table B2 lists the pollutants and meteorological data monitored by the MAML. Also indicated are the lower and upper detection limits for each monitored species.

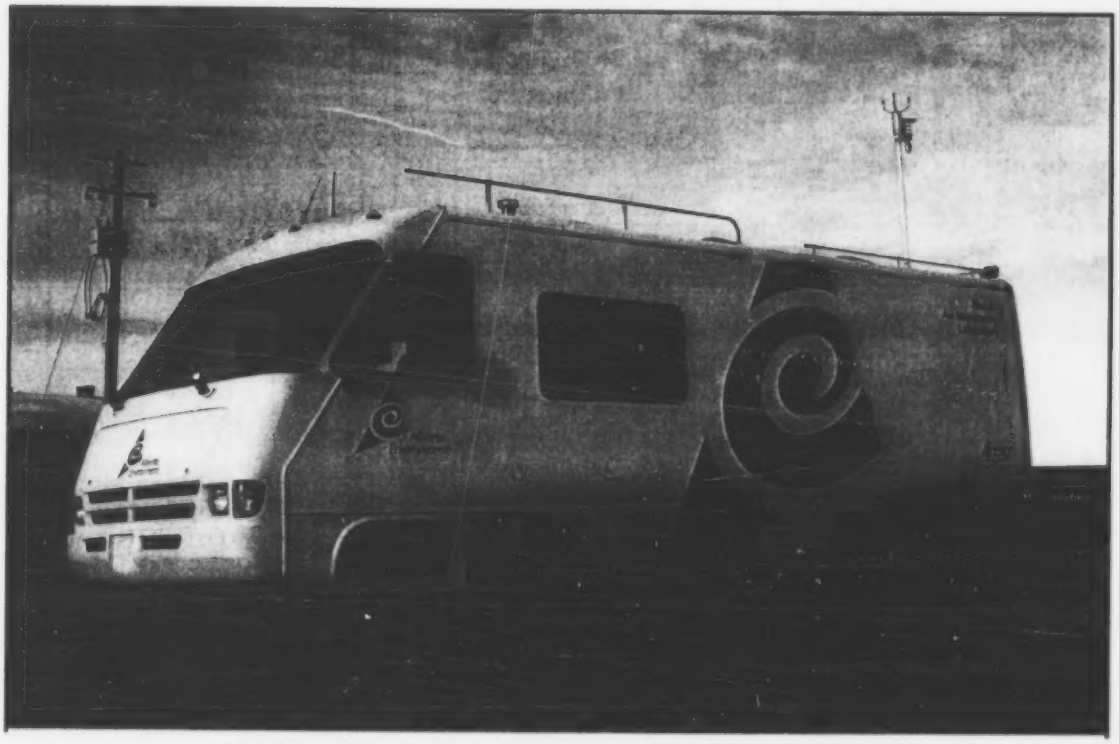

Figure B1: Alberta Environment's Mobile Air Monitoring Laboratory

Table B2: Pollutants and meteorological data monitoring by the MAML.

Pollutant	Operating Range	
	Lower Detection Limit*	Upper Detection Limit**
Ammonia (NH_3)	0.001 ppm	5 ppm
Ozone (O_3)	0.001 ppm	0.5 ppm
Carbon Monoxide (CO)	0.1 ppm	50 ppm
Hydrocarbons		
Methane (CH_4)	0.1 ppm	20 ppm
Reactive Hydrocarbons (RHC)	0.1 ppm	20 ppm
Total Hydrocarbons (THC)	0.1 ppm	20 ppm
Polycyclic Aromatic Hydrocarbons (PAH)	3 ng/m^3	1000 ng/m^3
Oxides of nitrogen		
Nitrogen dioxide (NO_2)	0.0006 ppm	1 ppm
Nitric Oxide (NO)	0.0006 ppm	1 ppm
Oxides of nitrogen (NO_x)	0.0006 ppm	1 ppm
Particulate Matter		
Total Suspended Particulates (TSP)	1 µg/m^3	1.0 g/m^3
Particulate Matter <10µm (PM_{10})	1 µg/m^3	1.0 g/m^3
Particulate Matter <2.5µm ($PM_{2.5}$)	1 µg/m^3	1.0 g/m^3
Sulphur Compounds		
Hydrogen Sulphide (H_2S)	0.001 ppm	1 ppm
Total Reduced Sulphur (TRS)	0.001 ppm	1 ppm
Sulphur Dioxide (SO_2)	0.001 ppm	2 ppm
Meteorological data		
Wind Speed	0 km/hr	200 km/hr
Wind Direction	0 degrees	360 degrees
Temperature	-40 °C	50 °C
Relative humidity	0%	100%

ppm - parts per million ng/m^3 = nanograms per meter cubed

µg/m^3 = micrograms per meter cubed g/m^3 = grams per meter cubed

* The ***lower detection limit*** indicates the minimum amount of pollutant and the lower limit of meteorological data can be measured by the instrument.

** The ***upper detection limit*** indicates the maximum amount of pollutant the instrument can detect and the upper limit for meteorological data measured. This limit is set to provide the optimum precision over that range. The upper limit can be raised, however, precision at the lower levels (where most levels are monitored) is then compromised.

Table B2: Pollutants and meteorological data monitoring by the MAML.

Lower Detection Limit*	Upper Detection Limit**
0.001 ppm	5 ppm
0.001 ppm	0.5 ppm
0.1 ppm	50 ppm
0.1 ppm	20 ppm
0.1 ppm	20 ppm
0.1 ppm	20 ppm
3 ng/m^3	1000 ng/m^3
0.0006 ppm	1 ppm
0.0006 ppm	1 ppm
0.0006 ppm	1 ppm
1 $\mu g/m^3$	1.0 g/m^3
1 $\mu g/m^3$	1.0 g/m^3
1 $\mu g/m^3$	1.0 g/m^3
0.001 ppm	1 ppm
0.001 ppm	1 ppm
0.001 ppm	2 ppm
0 km/hr	200 km/hr
0 degrees	360 degrees
-40 °C	50 °C
0%	100%

ppm - parts per million

ng/m^3 = nanograms per meter cubed

$\mu g/m^3$ = micrograms per meter cubed

g/m^3 = grams per meter cubed

* The ***lower detection limit*** indicates the *minimum* amount of pollutant and the lower limit of meteorological data can be measured by the instrument.

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